

What is Claimed is:

1. A catheter for delivering a vascular prosthesis within a body vessel, the vascular prosthesis having a radially self-expanding distal section and a proximal helical section, the catheter comprising:

an elongated member having distal and proximal ends;

a balloon attached to the elongated member adjacent to the distal end;

a sheath slidably disposed over the elongated member to restrain the vascular prosthesis against the elongated member during transluminal insertion of the catheter; and

means for engaging the distal section of the vascular prosthesis to prevent axial translation of the vascular prosthesis during proximal retraction of the sheath, the means for engaging affixed to the elongated member proximal of the balloon.

2. The catheter of claim 1, wherein the means for engaging comprises a polymer layer that has been treated to enhance frictional engagement with the distal section of the vascular prosthesis.

3. The catheter of claim 2 wherein the polymer layer comprises a proximal shoulder of the balloon.

4. The catheter of claim 1, wherein the means for engaging comprises raised features that interengage the distal section of the vascular prosthesis.

5. The catheter of claim 4 wherein the raised features are formed on a proximal shoulder of the balloon.

6. The catheter of claim 5, wherein the raised features are chosen from the group consisting of ribs, bumps, ridges, grooves, notches and selectively inflatable sections.

7. The catheter of claim 1, wherein the balloon is configured to engage a wall of the body vessel during deployment of the distal section of the vascular prosthesis to prevent axial displacement of the catheter relative to the body vessel.

8. The catheter of claim 1, wherein the balloon is configured to perform angioplasty of a stenosis disposed within the body vessel.

9. The catheter of claim 1, further comprising at least one radio-opaque marker disposed on the elongated member and a radio-opaque marker disposed adjacent to a distal end of the sheath.

10. The catheter of claim 1, wherein the elongated member further comprises an atraumatic tip disposed on the distal end and a lumen extending between the distal and proximal ends, the lumen dimensioned to slidably receive a guide wire further comprising of the elongated member.

11. A catheter for delivering a vascular prosthesis within a body vessel, the vascular prosthesis having a radially self-expanding distal section and a proximal helical section, the catheter comprising:

an elongated member having distal and proximal ends;

a balloon attached to the elongated member adjacent to the distal end;

a sheath slidably disposed over the elongated member to restrain the vascular prosthesis against the elongated member during transluminal insertion of the catheter; and

a polymer layer affixed to the elongated member proximal of the balloon, the polymer layer configured to engage the distal section of the vascular prosthesis and prevent axial translation of the vascular prosthesis during proximal retraction of the sheath.

12. The catheter of claim 11 wherein the polymer layer comprises a proximal shoulder of the balloon.

13. The catheter of claim 11, wherein the polymer layer defines raised features that interengage the distal section of the vascular prosthesis.

14. The catheter of claim 11, wherein the balloon is configured to engage a wall of the body vessel during deployment of the distal section of the vascular prosthesis to prevent axial displacement of the catheter relative to the body vessel.

15. The catheter of claim 11, wherein the balloon is configured to perform angioplasty of a stenosis disposed within the body vessel.

16. The catheter of claim 11, further comprising at least one radio-opaque marker disposed on the elongated member and a radio-opaque marker disposed adjacent to a distal end of the sheath.

17. A method of delivering a vascular prosthesis within a body vessel, the method comprising:

providing a delivery catheter loaded with a vascular prosthesis having a radially self-expanding distal section and a proximal helical section, the delivery catheter comprising an elongated member having distal and proximal ends, a balloon attached to the elongated member adjacent to the distal end, means for engaging a distal section of a vascular prosthesis and a sheath slidably disposed over the elongated member to restrain the vascular prosthesis against the elongated member;

transluminally inserting the delivery catheter within a vessel;

proximally retracting the sheath to expose the balloon;

inflating the balloon into engagement with a wall of the vessel to fix the position of the delivery catheter relative to the vessel during subsequent proximal retraction of the sheath.

18. The method of claim 17 further comprising retracting the sheath proximal of the distal section of the vascular prosthesis to deploy the distal section of

the vascular prosthesis, the means for engaging gripping the distal section against axial translation during proximal retraction of the sheath.

19. The method of claim 18 further comprising retracting the sheath proximal of the helical section of the vascular prosthesis to deploy the helical section into engagement with the vessel, wherein the balloon prevents axial translation of the delivery catheter and distributes force transmitted to the distal section to the wall of the vessel.

20. The method of claim 17 further comprising, prior to inflating the balloon into engagement with a wall of the vessel to fix the position of the delivery catheter:

inflating the balloon to engage and disrupt a stenosis disposed within the vessel; and  
deflating the balloon.